Suprascapular Nerve Decompression: An Updated Systematic Review

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INTRODUCTION:

In recent years, suprascapular nerve (SSN) decompression has emerged as a controversial procedure. Momaya et al. published the first systematic review of SSN decompression in 2018 noting satisfactory outcomes with low rates of complications; however, numerous studies published since have contributed to existing contention regarding the procedure. The purpose of this study is to provide an updated assessment of outcomes after SSN decompression.

METHODS:

PubMed (MEDLINE) and Cochrane Library databases were searched for relevant studies published prior to December 30, 2021. Studies were eligible for inclusion if they reported outcomes following SSN decompression at either the suprascapular notch or spinoglenoid notch. Outcomes including patient-reported clinical outcomes, objective strength testing, return to sport, pre- and postoperative electrodiagnostic testing, and Goutallier classification distribution were collected and pooled for assessment.

RESULTS:

In total, 730 patients from 33 studies were eligible for inclusion (Figure 1). The majority (89%) of patients underwent arthroscopic rather than open SSN decompression (Table 1). One prospective randomized trial reported early termination due to electromyographic complications caused by SSN in the setting of no observed clinical benefit of the procedure. Preoperative electrodiagnostic testing was conducted in 25/33 studies (678 patients) and postoperative electrodiagnostic testing in 13/33 studies (361 patients).

Visual Analog Scale (VAS) pain scores, American Shoulder Elbow Surgeon (ASES) Standardized Shoulder Assessment scores, UCLA shoulder scores, Constant scores and Subjective Shoulder Value (SSV) scores decreased significantly postoperatively while disabilities of the arm, shoulder, and hand (DASH) scores did not change significantly (Table 2). There was no statistical difference in scores between studies.

In total, 98% of patients returned to sport or military duty (n = 90/92, $X^2(10) = 2.66$, p = .988) and 96% returned to sport or military duty at their previous level of activity (n = 48/50, $X^2(8) = 11.5$, p = .176). Specific sports and activities are described in Table 3. In more broadly assessing function in terms of return to activities and work as well as sports and military duty, 94% of patients were able to return to activity (n = 123/131, $X^2(8) = 13.9$, p = .238).

Adverse events associated with SSN decompression or related surgeries were identified in 11% of patients (n = 64/576) (Table 4). Continued symptoms were noted in 12% of patients (n = 39/322) with three notable EMG-related symptomatic complications influencing cessation of the prospective randomized trial assessing SSN decompression. Rates of continued symptoms varied significantly between studies ($X^2(12) = 81.5$, p < .001). A minority of patients underwent reoperation (3.3%, n = 15/455), with significant differences in reoperation rates noted between studies ($X^2(15) = 30.1$, p = .011).

DISCUSSION AND CONCLUSION:

Patient-reported outcomes and rates of return to sport are favorable after SSN decompression, with higher rates of return to sport and military duty than previously noted. Interestingly, rates of return to sport and military duty were higher than rates of return to activity overall, which may reflect superior outcomes among patients with high levels of activity preoperatively. However, rates of complications and persistent symptoms appear to be higher than previously reported. The heterogeneity of continued symptoms and reoperation rates observed between studies further demonstrates inconsistency in these outcomes that warrants further investigation.

Figure 1 PRISMA Flow Diagram

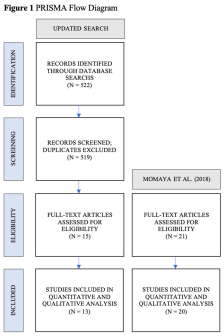

Table 1 Study Characteristics

Author	Journal	Level of Evidence	Location of Decompression	Technique	Shoulders (n)	Safety concerns removed/ monitoring
Cano-Martinez (2021)	SECOT	IV	SN	Scope	75	N
Akyol (2021)	Arthroscopy	IV	SN/SGN	Scope	42	N
Martin (2021)	Am J Sports Med	II	SGN	Scope	30	N
Chen (2021)	ASR Musculoskeletal Disorders	IV	SGN	Scope	12	N
Tilton (2020)	JSES Orthopedics	IV	SN	Scope	111	N
Clarke (2020)	JSES	II	SN	Scope	8	N
Katouzian (2020)	Journal of Shoulder and Elbow Surgery	III	SN	Scope	100	N
Feinberg (2019)	Musculoskeletal Medicine & Spine	II	SN/SGN	Scope		N
Yiasoulakis (2019)	International Orthopaedics	III	SN	Scope	31	N
Perez (2019)	Military Medicine	IV	SN/SGN	Scope	1	N
Gallego (2018)	Arthroscopy	III	SN	Scope	35	N
Kim (2017)	Arthroscopy	IV	SGN	Scope	12	N
Hashiguchi (2016)	SECOT	IV	SGN	Scope	6	N
Averbeck (2016)	ASMR	A	SN	Scope	18	N
Ahmad (2015)	AJSTA	IV	SN	Scope	28	N
Lanzetti (2014)	Arthroscopy	IV	SN (71), SSN and SGN (1)	Scope	72	N
Arroyo (2013)	ASMR	IV	SN	Scope	9	N
Kim (2012)	AJSM	IV	SGN	Scope	34	N
Kim (2012)	AJSM	IV	SGN	Scope	114	N
Gumina, S. (2011)	Res. Rep Orop	IV	SN	Scope	18	N
Kim (2011)	AJSM	IV	SGN	Scope	34	N
Ruiz (2011)	AJSM	IV	SN and/ or SGN	Scope	34	N
Cummins (2007)	Arthroscopy	IV	SN	Scope	6	N
Lafosse (2007)	Arthroscopy	IV	SN	Scope	18	N
Antoniadis (2006)	Arthroscopy	IV	SGN	Scope	14	N
Ferrari (2006)	Arthroscopy	IV	SGN	Scope	14	N
Charron (2005)	Acta Orthop Belg	IV	SN	Open	1	N
Cummings (2004)	AJSTA	IV	SGN	Scope	8	N
Ozaki (1988)	Clinical Orthopaedics	IV	SN	Open	16	N
Fahey (1999)	AJSM (BJ)	IV	SN (15), SN and SGN (9)	Open	24	N
Ferretti (1998)	AJSM	IV	SN	Open	1	N
Readett (1994)	JSES	IV	SGN and SN	Open	1	N
Hems (1990)	AJSM	IV	SN (1), SGN (1), SN and SGN (1)	Open	3	N

SGN = spinoglenoid notch, SN = suprascapular notch

Table 2 Patient-Reported Outcomes

	Studies (n)	n	Mean (SD)		Preoperative to postoperative comparison (P value)	Between-studies comparison (P value)
VAS	11	440	Preoperative	6.4 (1.7)	<.001	.370
			Postoperative	2.2 (0.71)		
ASES	6	133	Preoperative	46 (18)	.002	.144
			Postoperative	85 (21)		
UCLA	5	76	Preoperative	16 (5.4)	<.001	.261
			Postoperative	30 (3.6)		
Constant	4	116	Preoperative	52 (13)	.035	.464
			Postoperative	70 (7.1)		
DASH	5	93	Preoperative	42 (11)	.140	.247
			Postoperative	11 (9.3)		
SSV	3	95	Preoperative	44 (16)	.660	.296
			Postoperative	81 (10)		

Table 3 Sports Participation

Sport	N
Volleyball	52
Weightlifting	9
Water polo	8
Javelin throw	7
Military duty	7
Swimming	6
Tennis	3
Dance	1
Softball	1
Unspecified	24
Total	118

* Patients could report more than one sport

Table 4 Adverse Events

	% (N)	Description
Complications	11% (64/576)	
	2.8% (16)	Rotator cuff tetras
	2.8% (16)	Symptomatic hematoma
	1.9% (11)	Worsened spino-mandated radicular pain
	0.88% (4)	Rotator failure
	0.88% (4)	Shoulder arthritis
	0.88% (4)	Superficial soft tissue infection
	0.52% (3)	Healing failure
	0.52% (3)	Shoulder instability
	0.35% (2)	Transverse skin thickening
	0.17% (1)	Musculocutaneous nerve injury
Continued symptoms	13% (39/322)	
	9.4% (28)	Continued pain or discomfort
	2.8% (9)	Continued weakness
	0.88% (3)	Continued EMG-related symptoms
Reoperation	3.3% (15/455)	
	1.1% (5)	Revision SSN decompression
	0.87% (4)	Index or revision rotator cuff repair
	0.66% (3)	Revision of nerve weak shoulder arthroplasty
	0.22% (1)	Hemorrhoidectomy
	0.22% (1)	Biceps tenodesis
	0.22% (1)	Spine nerve/s for radicular pain